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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/700,185	12/18/2000	Takayuki Araki	P06971US00/L	2588

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EXAMINER	
RUTHKOSKY, MARK	

ART UNIT	PAPER NUMBER
1745	

MAIL DATE	DELIVERY MODE
06/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/700,185	ARAKI ET AL.	
	Examiner	Art Unit	
	Mark Ruthkosky	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 March 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-30,35-44,46 and 49-52* is/are pending in the application.

4a) Of the above claim(s) *1,5-29,37 and 41-44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *30,35,36,38-40,46 and 49-52* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/30/2007 has been entered.

Claim Rejections - 35 USC § 102

The rejection of claims 30, 35-36 and 38-40 under 35 U.S.C. 102(e) as being anticipated by Cisar (US 6,492,431) has been overcome by applicant's amendment to the claims.

The rejection of claims 30, 35-36 and 38-40 under 35 U.S.C. 102(b) as being anticipated by Cisar (US 5,635,039) has been overcome by applicant's amendment to the claims.

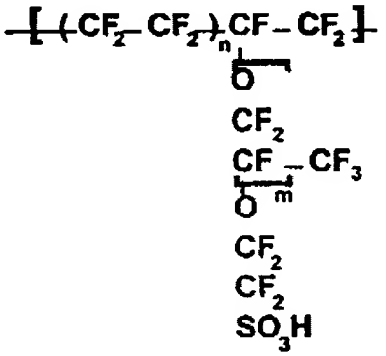
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 30, 35-36, 38-40, 46, and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cisar (US 6,492,431) OR Cisar (US 5,635,039.)

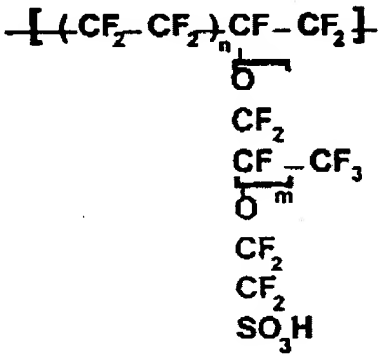
Cisar (US 6,492,431) teaches a material for a solid polyelectrolyte, comprising a multi-segmented fluoropolymer that comprises a block copolymer containing at least two types of fluoropolymer chain segments differing in monomer composition, at least one type of the fluoropolymer chain segments containing sulfonic acid functional groups.



One segment block contains polytetrafluoroethylene groups (PTFE) and another segment block contains perfluorovinyl ester with sulfonic acid functional groups. The crystalline melting point is over 300 C. The perfluorovinyl ester with sulfonic acid functional groups segment includes (a) an ethylenic fluoropolymer unit containing sulfonic acid functional groups; and (b) at least one type of ethylenic fluoromonomer unit copolymerizable with the unit (a) and containing no sulfonic acid functional groups. It is further noted that the polymer may include a sulfonyl fluoride group (figure 3 and accompanying text.) The material is commonly known as Nafion, which has an equivalent weight of 400-1600, (see example 2 for a weight of 950.) As the materials of the reference and the instant invention are equivalent, the modulus of elasticity of the materials will be the same.

Cisar (US 5,635,039) teaches a material for a solid polyelectrolyte, comprising a multi-segmented fluoropolymer that comprises a block copolymer containing at least two types of

fluoropolymer chain segments differing in monomer composition, at least one type of the fluoropolymer chain segments containing sulfonic acid functional groups. The material is defined to be Nafion, which has the following structure:



One segment block contains polytetrafluoroethylene groups (PTFE) and another segment block contains perfluorovinyl ester with sulfonic acid functional groups. The crystalline melting point is over 300 C. The perfluorovinyl ester with sulfonic acid functional groups segment includes (a) an ethylenic fluoropolymer unit containing sulfonic acid functional groups; and (b) at least one type of ethylenic fluoromonomer unit copolymerizable with the unit (a) and containing no sulfonic acid functional groups. It is further noted that the polymer may include a sulfonyl fluoride group (col. 13, lines 7-17.) The material is commonly known as Nafion, which has an equivalent weight of 400-1600, (see col. 7, lines 45-end for a weight of 1100.) As the materials of the reference and the instant invention are equivalent, the modulus of elasticity of the materials will be the same.

The references do not teach molecular weights for segment A and segment B. The references are silent to the molecular weight of the material. The Cisar references, however, disclose materials that comprise segment blocks containing polytetrafluoroethylene groups

(PTFE) and perfluorovinyl ester with sulfonic acid functional groups, commonly known as Nafion. The references show that each segment has a function in the copolymer. The Nafion component gives an ion-conducting element to the copolymer and the PTFE component gives a structural reinforcing element to the copolymer (see '431, col. 8, lines 30-44. and col. 7, lines 15-30.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to alter the amount of each material in order to provide a material having a desired size, strength or ionic conductivity depending on the desired application. For example, a fuel cell ion-conducting membrane may require a greater amount of an ion-conducting segment in order to conduct hydrogen. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

Response to Arguments

Applicant's arguments filed 8/15/2006 have been fully considered but they are not persuasive.

Applicant argues that the prior art does not teach the structure of the amended claims because the segment A does not have the newly recited ethylenic fluoromonomer (b) containing no sulfonic functional groups. This argument is not persuasive as the segment does have an ethylenic fluoromonomer (b) containing no sulfonic functional groups. One segment block contains polytetrafluoroethylene groups (PTFE) and another segment block contains perfluorovinyl ester with sulfonic acid functional groups. The perfluorovinyl ester with sulfonic acid functional groups segment includes (a) an ethylenic fluoropolymer unit containing sulfonic acid functional groups; and (b) at least one type of ethylenic fluoromonomer unit

copolymerizable with the unit (a) and containing no sulfonic acid functional groups. It is clear that when polymerized the combination of units use the electrons in the double bond to form the polymeric bonds between monomer units (see '431, figure 3, for example.)

Applicant argues that the references do not teach the recited molecular weight of segment B. This has been addressed in the rejection. The references are silent to the molecular weight of the material. The Cisar references, however, disclose the same materials that comprise segment block A, containing polytetrafluoroethylene groups (PTFE), and B, containing perfluorovinyl ester with sulfonic acid functional groups, commonly known as Nafion. The references show that each segment has a distinct function in the copolymer. The Nafion component gives an ion-conducting element to the copolymer and the PTFE component gives a structural reinforcing element to the copolymer (see '431, col. 8, lines 30-44. and col. 7, lines 15-30.) It would have been obvious to one of ordinary skill in the art made to alter the amount of each material in order to provide a material having a desired size, strength or ionic conductivity depending on the desired application. It is further noted that since segment B includes the same units as the ethylenic fluoropolymer of segment A, there is not a well-defined boundary in the polymer since different blocks may have a different number of units in the polymer. Thus, the combination of segments would be obvious to one skilled in the art based on the teachings of the Cisar references.

Applicant lastly argues that the reference does not teach a block copolymer and that the references were misinterpreted in this regard. This argument is not persuasive. The reference clearly states that membrane may be blended as well as alternating blocks of each type of segment described (col. 7, lines 15-30.)

> The composite membranes fabricated by the methods of the invention may comprise randomly blended polymers as well as alternating blocks, each block comprising essentially one particular polymer. For example, a composite membrane may be fabricated by forming, within each molecule, regions of pure PTFE and regions of low equivalent weight copolymer. The pure PTFE regions may crystallize to form a reinforcing matrix, while the low equivalent weight regions may furnish high proton conductivity paths. The methods of the invention comprise extruding and processing a polymer-block type composite membrane using the same techniques that may be used in fabricating a conventional random polymer membrane.

(Col. 8, lines 5-15.)

> For example, a composite membrane may be fabricated by forming, within each molecule, regions of pure PTFE and regions of low equivalent weight copolymer. The pure PTFE regions may crystallize to form a reinforcing matrix, while the low equivalent weight regions may furnish high proton conductivity paths. The methods of the invention comprise extruding and processing a polymer-block type composite membrane using the same techniques that may be used in fabricating a conventional random polymer membrane.

Cisar states that the polymer may include regions of pure PTFE and regions of the proton conductive region having sulfonic acid functional groups (col. 7, lines 15-30.) The material is referred to as a polymer block-type as compared with a random polymer. Further, the reference defines the PTFE segment to provide a reinforcing matrix and the proton conductive sulfonic acid region as a high proton conductive region (see '431, col. 7, line 15 to col. 8, line 15.) These regions are equivalent to those in applicant's claimed invention. Thus, Cisar is not silent with regard to a block copolymer. The reference clearly states that the material may be a block copolymer comprising both units of PTFE and a mixed polymer with sulfonic groups included. Thus, the claims stand rejected over the applied references.

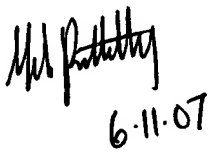
Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The

examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

Mark Ruthkosky
Primary Patent Examiner
Art Unit 1745



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